

Claims

1. A cylindrical roller bearing comprising an inner ring having an inner ring raceway surface, an outer ring having an outer ring raceway surface and cylindrical rollers each disposed between the inner ring raceway surface and the outer ring raceway surface, wherein at least one of the inner ring and the outer ring has a flange portion provided with a roller guide-surface which contacts with and guides end faces of the cylindrical rollers, the cylindrical roller bearing is characterized in that

supposing that a diameter of the cylindrical roller is D_a , the end face of the cylindrical roller away from a center axis of the cylindrical roller by $0.40D_a$ in a radial direction is set as a first position, and the end face of the cylindrical roller away from the center axis of the cylindrical roller by $0.35D_a$ in the radial direction is set as a second position, the end face of the cylindrical roller contacts with the roller guide-surface of the flange portion between the first position and the second position,

the end face of the cylindrical roller has a convex-shaped crowning portion formed by a continuous curve which passes the first position and the second

position, and

an angle α formed between a straight line connecting the first position and the second position and a straight line perpendicular to the center axis of the cylindrical roller is set to be 0.5° or less.

2. The cylindrical roller bearing according to claim 1, characterized in that the angle α satisfies a relation of $\alpha < \theta$ with respect to an open angle θ of the roller guide-surface, and a surface roughness of at least the crowning portion at the end face of the cylindrical roller is set in a range of 0.02 to 0.15 μmRa .

3. A cylindrical roller bearing comprising an inner ring having an inner ring raceway surface, an outer ring having an outer ring raceway surface and cylindrical rollers each disposed between the inner ring raceway surface and the outer ring raceway surface, wherein at least one of the inner ring and the outer ring has a flange portion provided with a roller guide-surface which contacts with and guides end faces of the cylindrical rollers, the cylindrical roller bearing is characterized in that

the end face of the cylindrical roller has a convex-shaped crowning portion which contacts with the

roller guide-surface when a load of a predetermined value or more acts, and

a radial direction distance h between the rolling surface of the cylindrical roller and a cross point where
5 the end face of the cylindrical roller contacts with a phantom line along the roller guide-surface in a state where no load acts satisfies a relation of $h = Da / 2 - R' \times \sin (\theta)$ and $0.05 \text{ (mm)} \leq h \leq 0.5 \text{ (mm)}$, wherein Da represents a diameter of the cylindrical roller, θ
10 represents a flange open angle of the roller guide-surface, and R' represents a curvature radius of the crowning portion.

4. The cylindrical roller bearing according to claim
15 3, characterized in that the a ratio between the radial direction distance h and a flange height L of the flange portion satisfies a relation of $0.01 \leq h/L \leq 0.13$, and the cross point faces on a relief groove formed in at least one of the inner ring raceway surface and the outer
20 ring raceway surface.